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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**Patent Application**

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Inventor(s): Sho Kou

Title: METHOD AND SYSTEM FOR DEVICES EFFICIENTLY SHARING INFORMATION
REGARDING THE CONTENT OF A DIGITAL TELEVISION BIT-STREAM

The Commissioner of Patents and Trademarks
Washington, D.C. 20231
Sir:

Transmittal of a Patent Application
(Under 37 CFR §1.53)

Transmitted herewith is the above identified patent application, including:

- ☒ Specification, claims and abstract, totaling 23 pages.
 Formal drawings, totaling _____ pages.
☒ Informal drawings, totaling 7 pages.
☒ Declaration and Power of Attorney.
 Information Disclosure statement.
 Form 1449
☒ Assignment(s)
☒ Assignment Recordation Form (duplicate)
 Preliminary Amendment

Other: _____

FEES DUE

The fees due for filing the specification pursuant to 37 C.F.R. § 1.16 and for recording of the Assignment, if any, are determined as follows:

CLAIMS					
	NO. OF CLAIMS		EXTRA CLAIMS	RATE	FEES
Basic Application Fee					\$690.00
Total Claims	22	Minus 20=	2	X \$18 =	\$36.00
Independent Claims	3	Minus 3=	0	X \$78=	\$0.00
If multiple dependent claims are presented, add \$260.00					\$0.00
Add Assignment Recording Fee of \$40.00 If Assignment document is enclosed					\$40.00
TOTAL APPLICATION FEE DUE					\$766.00

PAYMENT OF FEES

The full fee due in connection with this communication is provided as follows:

1. Not enclosed
 - ☐ No filing fee is to be paid at this time.
2. Enclosed
 - ☒ Filing fee
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 - ☐ Petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached
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 - ☒ The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No.: 23-0085. A duplicate copy of this authorization is enclosed.
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This application is filed pursuant to 37 C.F.R. § 1.53 in the name of the above-identified Inventor(s).

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Respectfully submitted,

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UNITED STATES PATENT APPLICATION FOR

METHOD AND SYSTEM FOR DEVICES EFFICIENTLY SHARING INFORMATION
REGARDING THE CONTENT OF A DIGITAL TELEVISION BIT-STREAM

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METHOD AND SYSTEM FOR DEVICES EFFICIENTLY SHARING INFORMATION
REGARDING THE CONTENT OF A DIGITAL TELEVISION BIT-STREAM

RELATED U.S. APPLICATION

5 This Application is related to U.S. Provisional Application entitled,
"Selection Specifier Valid Flags And Selection Specifier Attributes Fields
Assignments For AV/C Tuner Broadcast System-ATSC Digital Television,"
Application Number 60/146,071, filed on July 28, 1999. Said provisional
application is hereby incorporated by reference.

10

FIELD OF THE INVENTION

 The present invention relates to the field of digital television. Specifically,
the present invention relates to a system and method for efficiently allowing a
controller device to receive information from a tuner device regarding the content
15 of a digital television bit-stream.

BACKGROUND ART

 The process of transmitting digital television signals, whether terrestrially or
over cable, involves digitizing, compressing, and multiplexing video and audio
20 signals into a single bit-stream before transmitting them. The bandwidth in a
typical terrestrial broadcast is wide enough to transmit a number of compressed
digitized television channels over the same bit-stream. Additionally, data such as,
weather reports, stock prices, news, pay-per-view information, and classified
advertisements may be multiplexed into the bit-stream.

Because the bit-stream contains a variety of information, there must be a way for the receiving end to know the content of the bit-stream. Therefore, Program and System Information Protocol (PSIP) tables are multiplexed into the bit-stream to describe both system information and event information of the signal within the bit-stream. System information allows navigation and access to each of the television channels within the bit-stream. Event (or program guide) information describes content information for browsing and selection. The Program and System Information Protocol (PSIP) describes a protocol for transmission of a collection of such data tables within the bit-stream. (See, e.g., the specification entitled, "Program and System Information Protocol for Terrestrial Broadcast and Cable", Advanced Television System Committee, Document A65, December 23, 1997).

Some examples of the tables are the System Time Table (STT) which carries time information needed for an application requiring synchronization. The Master Guide Table (MGT) lists version numbers, length in bytes, and Packet Identifiers (PIDs) for all of the PSIP tables except the System Time Table. The Virtual Channel Table (VCT) contains a list of attributes for all channels carried in the bit-stream. This table has a terrestrial version (TVCT) and a cable version (CVCT). The Rating Region Table (RRT) carries rating information, e.g., G, PG, R, etc. for various geographic regions. The Event Information Table (EIT) contains information regarding events on channels in the bit-stream, such as titles and start times. The Extended Text Table (ETT) contains detailed information about channels and events in the bit-stream.

When one device in a digital television receiving system needs information about the bit-stream from another device, it issues a Direct Select Data (DSD) command. This command is part of the AV/C (Audio Video Control) Tuner Model and Command Set Specification and allows event and navigational information
 5 provided by the service providers to be understood. The information includes the tables discussed above.

In particular, the DSD command has a `dsd_selection_specification[n]` field,
 10 which is used to specify which table is to be accessed. Figure 1 illustrates a `dsd_selection_specification[n]` field 200. The byte at offset 00 comprises flags 251. When a flag 251 is set, the value in the associated attribute field 260, is valid. For example, when the `table_id` flag 252 is set, the associated `table_id` attribute field 262 contains a valid `table_id`. If the `table_id` flag 252 is not set, then whatever
 15 value that may be in the `table_id` attribute field 262 is invalid, but a space is nevertheless reserved for it. The same applies to the flags 254 - 258 and their respective associated attribute fields 264 - 271.

For the issuing device to request the MGT, TVCT, CVCT, or STT table, the
 20 `table_id` flag 252 is set and the `table_id` is specified in the `table_id` attribute field 262. Selecting the Rating Regions table is accomplished by setting the `table_id` flag 252 and rating region 256 flag, as well as specifying the `table_id` 262 and the rating_region 267. Selecting the Event Information Table is accomplished by setting the `table_id` flag 252 and source_id flag 254, as well as specifying the
 25 `table_id` attribute 262 and the source_id attributes 264 - 265. Selecting the

Extended Text Table is accomplished by setting the table_id flag 252 and ETM_id flag 258, as well as specifying the table_id attribute 262 and the ETM_id attributes 268 - 271.

- 5 The issuer of the DSD command requests just one table at a time.

Therefore, a separate command 200 must be issued for each table. Unfortunately, many bytes in the DSD command data structure are not used. For example, when the issuer requests an event information table, attribute fields 266 - 271 are not used at all. Therefore, the command structure 200 is inefficient, and many of these

- 10 command structures are issued during the normal course of system activity. Consequently, memory space on the devices is wasted. Additionally, bandwidth is wasted transmitting a command 200 with bytes that have no meaning or use.

SUMMARY OF THE INVENTION

Therefore, it would be advantageous, then, to provide a method and system for efficiently allowing a controller device to receive information from a tuner device regarding the content of a digital television bit-stream. What is further
5 needed is a method and system which does not require substantial memory space in the devices. What is even further needed is a method and system which takes a minimum of bandwidth to transfer the information between the devices.

The present invention provides a method and system for efficiently allowing
10 a controller device to receive information from a tuner device regarding the content of a digital television bit-stream. The present invention does so with an efficient command structure which does not waste memory space in the devices. Furthermore, the present invention provides for a method and system which uses bandwidth efficiently. Further still, the present invention is compatible with existing
15 standards. The present invention provides these advantages and others not specifically mentioned above but described in the sections to follow.

A method and system for efficiently allowing a controller device to receive information from a tuner device regarding the content of a digital television bit-
20 stream is disclosed. The present invention first receives a digital television bit-stream at a tuner device. The digital television bit-stream comprises video, audio, and data information, as well as tables that describe the content of the bit-stream. Next, to obtain a table, a controller device sets a value specifying a desired table in an attribute field of a command. Next, the controller sets at least one flag in a
25 flag field of the command. The setting of the flag indicates the table which is being

requested. Additionally, because a single attribute field may hold different types of information, the flags indicate which type of information is in the attribute field for this issuance of the command. The controller, then issues the command to the tuner, which determines what table is being requested, based upon the flags set.

- 5 The tuner then returns that table to the controller. Using the present invention, the command data structure only reserves space for valid data and does not require the allocation of data space for invalid data, thereby making the present invention more efficient over the prior art.

110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an illustration of a Direct Select Data command which is issued from a controller device to a tuner device to request information about a bit-stream of digitized television data, according to conventional techniques.

5

Figure 2 is an illustration of the components used to form a bit-stream of digitized television information, which is an input to an embodiment of the present invention.

10

Figure 3 is an illustration of an audio-visual network, in which an embodiment of the present invention may be practiced.

Figure 4 is a schematic of a computer system, which may be useful to implement an embodiment of the present invention.

15

Figure 5 is an illustration of a compact Direct Select Data command which is issued from a controller device to a tuner device to request information about a bit-stream of digitized television data, according to an embodiment of the present invention.

20

Figure 6 is a flowchart illustrating the steps of a controller device requesting and receiving information regarding a bit-stream of television information, according to an embodiment of the present invention.

Figure 7 is a flowchart illustrating the steps of a tuner device determining the type of information to send to the controller, according to an embodiment of the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

In the following detailed description of the present invention, a system and method for efficiently allowing a controller device to receive information from a tuner device regarding the content of a digital television bit-stream, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be recognized by one skilled in the art that the present invention may be practiced without these specific details or with equivalents thereof. In other instances, well known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the present invention.

NOTATION AND NOMENCLATURE

Some portions of the detailed descriptions which follow are presented in terms of procedures, steps, logic blocks, processing, and other symbolic representations of operations on data bits that can be performed on computer memory. These descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. A procedure, computer executed step, logic block, process, etc., is here, and generally, conceived to be a self-consistent sequence of steps or instructions leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated in a computer system. It has proven convenient at times, principally for reasons of

common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like.

It should be borne in mind, however, that all of these and similar terms are
 5 to be associated with the appropriate physical quantities and are merely
 convenient labels applied to these quantities. Unless specifically stated otherwise
 as apparent from the following discussions, it is appreciated that throughout the
 present invention, discussions utilizing terms such as "indexing" or "processing" or
 "computing" or "translating" or "calculating" or "determining" or "scrolling" or
 10 "displaying" or "recognizing" or the like, refer to the action and processes of a
 computer system, or similar electronic computing device, that manipulates and
 transforms data represented as physical (electronic) quantities within the computer
 system's registers and memories into other data similarly represented as physical
 quantities within the computer system memories or registers or other such
 15 information storage, transmission or display devices.

METHOD AND SYSTEM FOR DEVICES EFFICIENTLY SHARING INFORMATION REGARDING THE CONTENT OF A DIGITAL TELEVISION BIT-STREAM

20 The present invention provides for a method and system for efficiently
 allowing a controller device to send requests to and receive information from a
 tuner device regarding the content of a digital television bit-stream in a network of
 audio/video components. The present invention uses the valid flags from a direct
 select data (DSD) command structure from the AV/C Tuner Model and Command
 25 Set Specification to not only indicate that an attribute field of the command is valid,

but to also specify what type of information is being represented in the attribute fields. In this fashion, a single attribute field may be used to represent different types of information, depending on how the flags are configured. This provides for an efficient DSD command structure because data spaces do not have to be

5 allocated for unused or invalid data.

Figure 2 illustrates a system 150 for producing a bit-stream 160 of multiplexed digital television information. System 150 inputs analog audio and video signals, which are digitized by A/D converters 170 and 172. Therefore,

10 multiple television channels may exist in a single bit-stream. Next, the signals are compressed at compression stages 180 and 182. The compressed signals are input to multiplexer 188, along with data 185 to produce a single bit-stream 160. Furthermore, tables 190 are multiplexed into the bit-stream 160 to provide information regarding the content of the bit-stream 160 itself. These tables 190

15 may be PSIP tables containing information about the content of the bit-stream, although it will be understood that the present invention is well-suited to operate with tables 190 in the bit-stream 160 in other formats, as well.

Figure 3 illustrates an audio-visual network 300, in which the present

20 invention may be practiced, having a number of devices (302 - 308) connected by a IEEE 1394 serial bus, which serves as a communication link. Example devices are television set-top boxes, camcorders, VCRs, and the like. One of the devices, for example, a set-top box, acts as a controller 306 and issues commands when the controller 306 needs event or system information regarding the bit-stream 160.

25 The target device (e.g., a tuner 308) executes the command and returns the

requested information, for example, a table 190 to the controller 306. The tuner 308 may be any device capable of receiving the digital bit-stream 160. The present invention is well-suited to operate with other bus types and device types. Furthermore, it is not required that a controller device 306 issue the command and
5 that a tuner device 308 receive the command. For example, other devices may send and/or receive the command.

Figure 4 illustrates circuitry of computer system 100, which may form a platform upon which to perform an embodiment of the present invention in one or
10 more of the devices. Namely, any of the devices in Figure 3 may include computer system 100. Computer system 100 includes an address/data bus 99 for communicating information, a central processor 101 coupled with the bus for processing information and instructions, a volatile memory 102 (e.g., random access memory RAM) coupled with the bus 99 for storing information and
15 instructions for the central processor 101 and a non-volatile memory 103 (e.g., read only memory ROM) coupled with the bus 99 for storing static information and instructions for the processor 101. Computer system 100 also includes an optional data storage device 104 coupled with the bus 99 for storing information and instructions.

20

Figure 5 illustrates a command structure 500 that the controller device 306 may issue to the tuner device 308 in one embodiment of the present invention. Command 500 is realized in computer readable memory and can be broadcast as a digitized message or "packet" from one device to another. The controller 306
25 issues this command 500 when information regarding the content of the bit-stream

160 is needed. The command 500 is comprised of a flag field 501 comprising the flags: table_id 502, source_id 504, rating_region 506, and ETM_id 508. In one embodiment of the invention, flags 504 - 508 are mutually exclusive. However, flag 502 may be set with any other flag. The present invention is suited to using other types of flags or additional flags in the flag field 501. Also, the order of flags may be altered, if desired. The settings of these flags defines which tables 190 the command issuer (e.g., controller 306) wishes the command receiver (e.g., tuner 308) to send back.

10 Command 500 in Figure 5 also comprises attribute fields 511, which contain information regarding the type of information which the issuer of the command 500 seeks. In one embodiment, the type of information comprises system information such as, the SST, MGT, TVCT, and CVCT tables, and event information, such as the RRT, EIT, and ETT tables. In particular, attribute field 521 is the table_id attribute field. Attribute field 522 may contain three different types of information. First, the most significant byte (MSB) of the source_id attribute field, second the MSB of the rating region attribute field, and third the MSB of the ETM_id attribute field. By using a single attribute field 511 to represent three different types of information (one at a time), this embodiment of the present invention saves memory space in the devices and reduces the size of the command 500 to be transferred between devices. Also, the command 500 does not need to reserve data space for invalid data.

In a similar fashion, attribute field 523 may comprise three different types of information. First, the least significant byte (LSB) of the source_id attribute field,

second, the LSB of the rating region attribute field, and third, the second MSB of the ETM_id attribute field. Attribute fields 524 and 525 comprise, respectively, the third MSB and LSB of the ETM_id attribute field. It will be appreciated that the order of the attribute fields 511 and which attributes are assigned to a given field is not critical to gaining efficiency. Hence, the present invention is well-suited to other arrangements of attributes fields 511 in the command 500.

The issuer of the command 500 selects the desired table as follows. To select the MGT, the TVCT, the CVCT, or the STT, the table_id flag 502 is set by the command issuer. Additionally, the appropriate value is specified in the table_id attribute field 521. To select the Rating Region Table, the table_id flag 502 is set along with the rating region flag 504. Additionally, the appropriate values are set in attribute fields 522 and 523.

To select the Event Information Table, the table_id flag 502 and the source_id 503 flag are set. Additionally, the appropriate value is set in attribute fields 522 - 523. To select the extended Text Table, the table_id flag 502 and the ETM_flag 505 are set. Additionally, the appropriate values are specified in attribute fields 522 - 525.

20

Figure 6 illustrates a flowchart of the steps of a process 600 of a controller 306 requesting and receiving information regarding a bit-stream 160 from tuner 308. At step 610, tuner 308 receives a bit-stream 160 of digitized television information. This signal comprises digitized video, digitized audio, as well as data information. The digitized signal may be in MPEG format, although the present

invention is not limited to signals using this format. The data information may include data such as weather reports, stock prices, etc. Additionally, tables which describe the content of the bit-stream 160 itself may be a part of the bit-stream.

One format for these tables is described in a standard entitled "Program and

- 5 System Information Protocol for Terrestrial Broadcast and Cable," Advanced Television System Committee, Document A65, December 23, 1997. However, the present invention is well-suited to operate on bit-streams with tables of other formats.

- 10 In step 620 of this embodiment of the present invention a controller 306 sets a value in an attribute field 511 in a command 500 for requesting information about the content of the bit-stream 160. The command 500 may be a direct select data (DSD) command, which is described in the AV/C Tuner Model and Command Set Specification. The information requested may be a table 190, such as
- 15 described herein. Each table 190 has its own attributes to avoid confusion when selecting the tables 190.

- In step 630, the controller 306 sets flags in the command flag field 501 to specify which table 190 is desired. These flags also describe what type of
- 20 information is being represented in the attribute field 511. For example, if the rating region flag 504 is set, then the value in the attribute fields 522 - 523 represent a rating region table. In this case, attribute fields 522 - 523 do not represent source_id or ETM_id table information. (As these fields can if other flags are selected.) Thus, an attribute field 511 may refer to different types of data,
- 25 depending on the flags 501 which are set. However, no confusion will exist over

the type of information which is being represented in an attribute field 511 for a given command 500.

In step 640, the controller 306 issues the command 500 to the tuner 308. In
5 step 650, the tuner 308 executes the command and returns the requested table 190 to the controller 306.

Figure 7 illustrates a flowchart of a process 700 of the tuner 308
determining what table 190 from the bit-stream 160 to return to the controller 308.
10 In step 710, the controller 306 issues a command 500 to the tuner 308. In step 720, the tuner 308 checks to see if the table_id flag 502 is set. As this embodiment of the present invention requires this flag to be set for all requests, the tuner 308 will not return any table 190 if this flag 502 is not set. If it is set then, at step 730, the tuner 308 checks to see if the rating region flag 504 is also set. If so, the tuner
15 308 references, in step 735, the values in attribute fields 522 - 523. These values are used to send back rating region table information to the controller 306. As only one table 190 may be returned per command 500, the process then goes to the end step.

20 If the rating region table flag 504 was not set, then at step 740, the tuner 308 checks the event information flag 503. If it is set, then the very same attribute fields (522 and 523) used in step 735 for rating region attributes are now used, in step 745 for event table attributes. The tuner references these attribute fields 522 - 523 and returns an event table 190 to the controller 306. This concludes command
25 processing as only one table 190 may be returned per command 500.

If the event information table flag 503 was not set, then the tuner 308 checks for the ETM_id flag 505. If it is set, then the tuner 308 references attribute fields 522 - 525. Using that information, the tuner 308 returns an ETM table 190 to the
5 controller 306. Because the ETM attribute field overlaps with other attribute fields in the command structure, the command is compact and hence efficient. Again, the process ends here after the table 190 is returned to the controller 306.

If the ETM_id flag 505 was not set, then the tuner 308 refers to the table id
10 attribute field 521 to determine whether tables 190, such as MGT, TVCT, CVCT, or STT are to be returned. It will be borne in mind that the order of checking the flags 501 is not critical and that other flags 501 and attribute fields 511 may also be used.

15 The preferred embodiment of the present invention a method and system for efficiently allowing a controller device to receive information from a tuner device regarding the content of a digital television bit-stream, is thus described. While the present invention has been described in particular embodiments, it should be appreciated that the present invention should not be construed as
20 limited by such embodiments, but rather construed according to the below claims.

CLAIMS

We claim:

1. In a digital television receiving system, a method of sharing information comprising the steps of:

- 5 a) a first device receiving a digital television bit-stream;
- b) a second device setting a value in an attribute field of a command, said command for requesting information regarding said bit-stream;
- c) said second device setting at least one flag of a plurality of flags in said command, said step of setting defining the type of information said attribute field
- 10 describes;
- d) said second device issuing said command to said first device; and
- e) said first device responsive to said value of said flag of said request, returning one table of a plurality of tables to said second device.

- 15 2. The method of Claim 1 wherein said plurality of tables comprise a master guide table, a terrestrial virtual channel table, a cable virtual channel table, a system time table, a rating region table, an event information table, and an extended text table.

- 20 3. The method of Claim 1 wherein said command is a direct select data command.

4. The method of Claim 1 wherein said type of information in step c) comprises event information.

5. The method of Claim 1 wherein said type of information in step c) comprises navigational information.

5 6. The method of Claim 1 wherein said first device is a tuner device.

7. The method of Claim 1 wherein said second device is a controller device.

8. The method in Claim 1 wherein said digital television bit-stream comprises
10 multiplexed digitized video, digitized audio, data, and said plurality of tables.

9. The method of Claim 8 wherein said digitized video is in MPEG format.

10. The method of Claim 1 wherein said devices are coupled together via an
15 IEEE 1394 serial bus architecture.

11. A digital television receiving system comprising:
a first device having a memory unit for storing a command, wherein said
command has a plurality of flags and a plurality of attribute fields, wherein at
20 least one of said attribute fields is operable to store information of different
types, and wherein said plurality of flags are configurable to identify the type of
information held in said plurality of attribute fields;
a second device connected to a digital television bit-stream;
a communication link connecting said first device and said second
25 device;

said first device operable to issue said command to said second device;
and

said second device operable to return one table of a plurality of tables
from said digital video bit-stream to said first device.

5

12. The digital television receiving system of Claim 11 wherein the value in a
first of said plurality of attribute fields is selectable between a system time table, a
rating region table, and an extended text table, according to settings of said
plurality of flags.

10

13. The digital television receiving system of Claim 11 wherein said first
device is a controller device.

14. The digital television receiving system of Claim 11 wherein said second
15 device is a tuner device.

15. The method in Claim 11 wherein said digital television bit-stream comprises
multiplexed digitized video, digitized audio, data, and said plurality of tables.

20 16. The method of Claim 15 wherein said digitized video is in MPEG format.

17. In a digital television receiving system comprising devices coupled together
via a serial bus architecture, a method of requesting information comprising the
steps of:

a) a first device issuing a request for information regarding the content of a digital television bit-stream, said request comprising a command having a plurality of flags which specify the type of information requested and a plurality of attribute fields configurable to hold information of different types, wherein the type of
 5 information in the attribute field is specified by said plurality of flags.

b) a second device connected to said first device receiving said request for information;

c) based on said plurality of flags, said second device determining one table of a plurality of tables which the value in the valid attribute signifies; and

10 d) said second device transferring said requested information about the content of said bit-stream to said first device.

18. The method of Claim 17 wherein said plurality of tables comprise a master guide table, a terrestrial virtual channel table, a cable virtual channel table, a
 15 system time table, a rating region table, an event information table, and an extended text table.

19. The method of Claim 17 wherein said first device is a controller device.

20 20. The method of Claim 17 wherein said second device is a tuner device.

21. The method in Claim 17 wherein said digital television bit-stream comprises multiplexed digitized video, digitized audio, data, and said plurality of tables.

22. The method of Claim 21 wherein said digitized video is formatted according to MPEG.

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ABSTRACT

A method and system for efficiently allowing a controller device to receive information from a tuner device regarding the content of a digital television bit-stream. The present invention first receives a digital television bit-stream at a
5 tuner device. The digital television bit-stream comprises video, audio, and data information, as well as tables that describe the content of the bit-stream. Next, to obtain a table, a controller device sets a value specifying a desired table in an attribute field of a command. Next, the controller sets at least one flag in a flag field of the command. The setting of the flag indicates the table which is being
10 requested. Additionally, because a single attribute field may hold different types of information, the flags indicate which type of information is in the attribute field for this issuance of the command. The controller, then issues the command to the tuner, which determines what table is being requested, based upon the flags set. The tuner then returns that table to the controller.

15

200

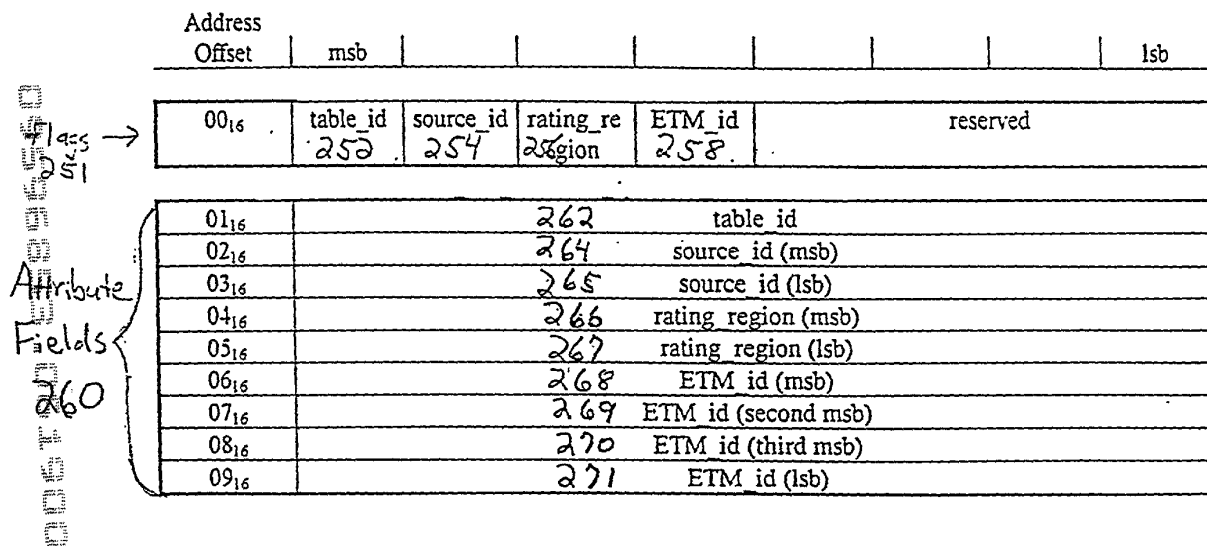


FIGURE 1

(Prior Art)

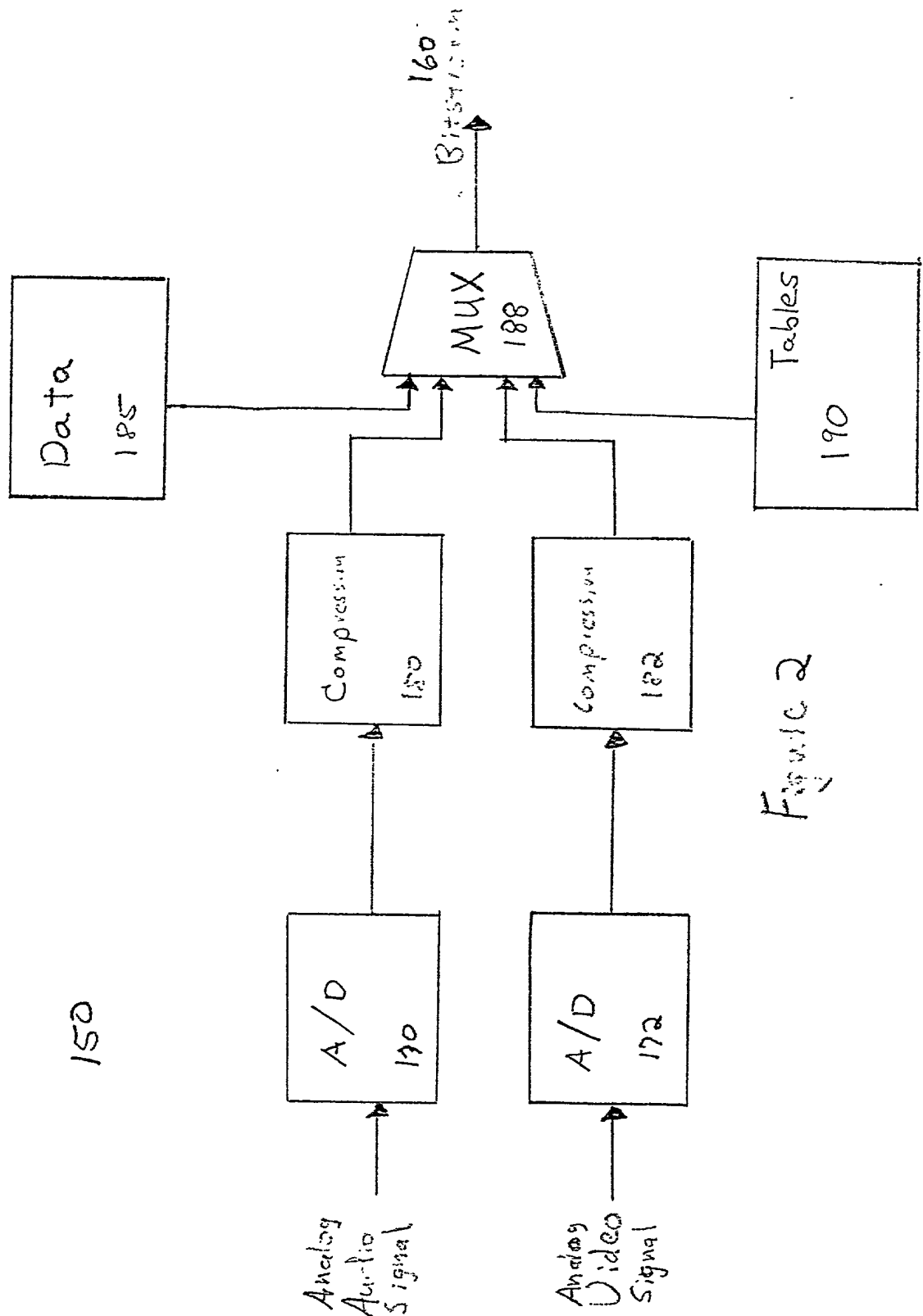


Figure 2

300

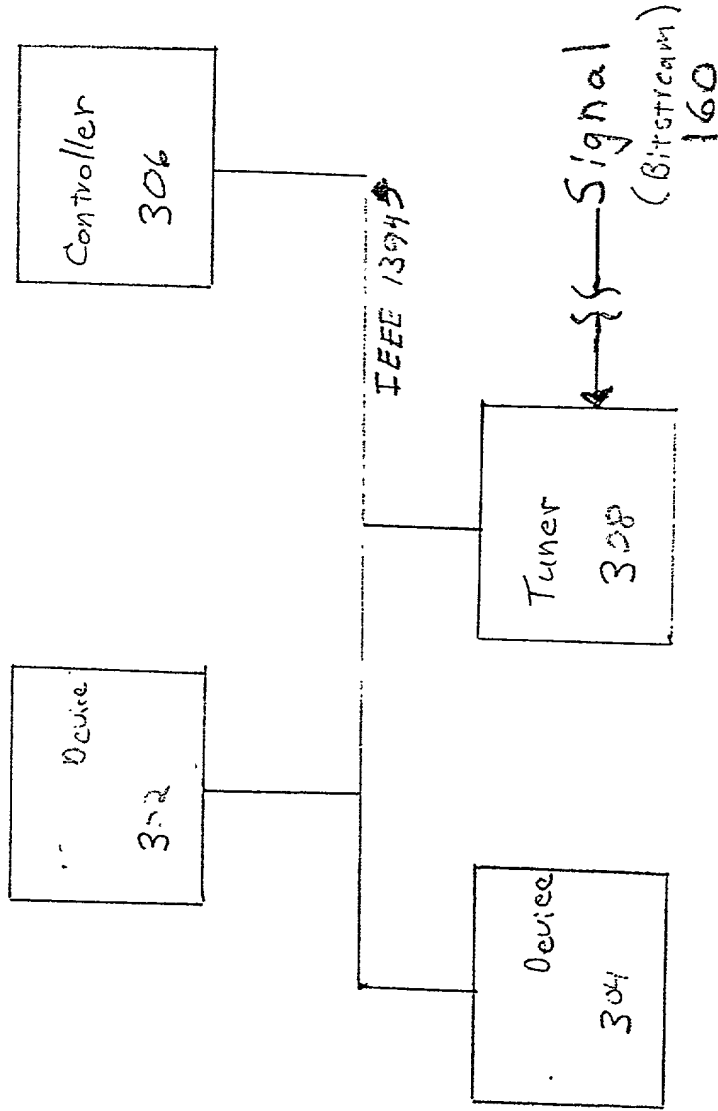


Figure 3

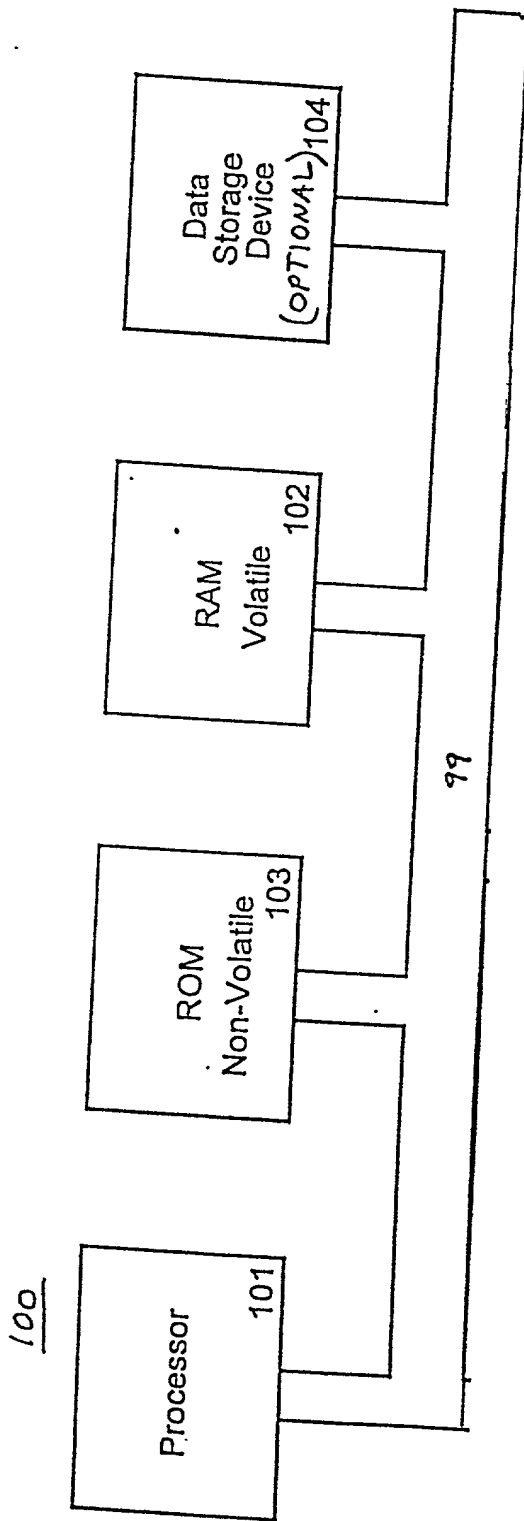


FIGURE 4

500

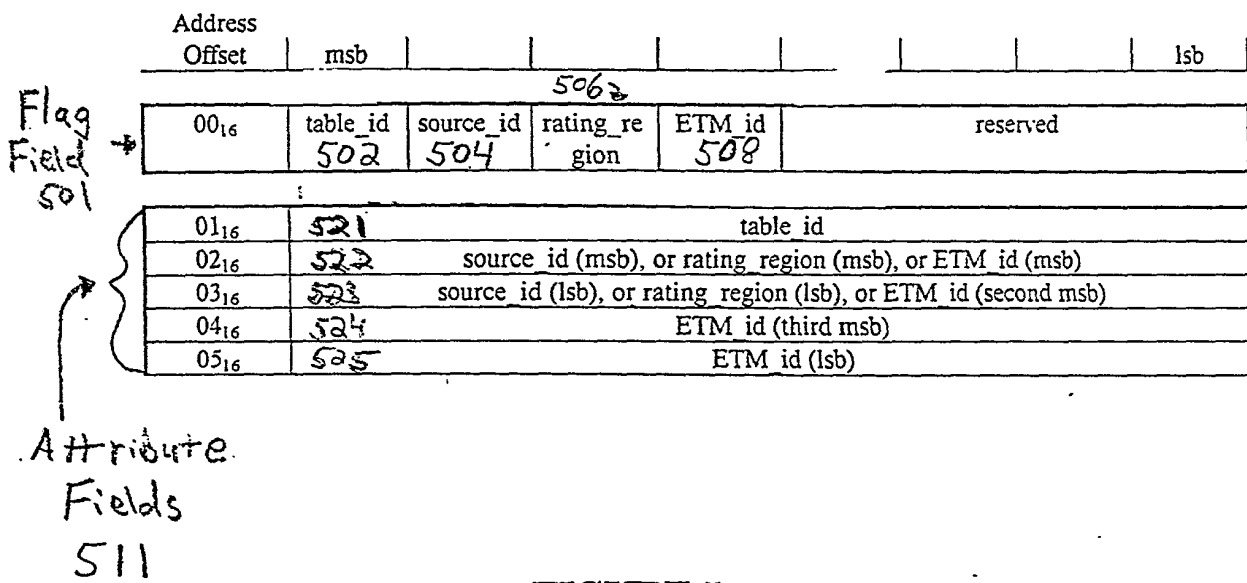


FIGURE 5

Begin

600

A Tuner Device Receives a Digital Television Bitstream Comprising Video,
Audio, Data, and Table Information
610

A Controller Device Connected to the Tuner Sets an Attribute Field in a Direct
Select Data Command
620

A Controller Device Connected to the Tuner Sets Flags in a Direct Select Data
Command
630

Controller Device Issues Command to Tuner Device
640

Tuner Device Returns A Table of Information To the Controller Device
650

End

FIGURE 6

Begin

700

A Controller Device Connected to A Tuner Device Requests the Tuner for Specific Data Within A Bitstream of Digital Television Information

710

Is the Table_Id Flag Set?

720

Yes

Is the Rating Region Flag Set?

730

Yes

Tuner Returns the Rating Region Table to the Controller Device

735

No

Is the Source_ID Flag Set?

740

Yes

Tuner Returns the Event Information Table to the Controller Device

745

No

Is the Extended Text Flag Set?

750

Yes

Tuner Returns the Extended Text Table to the Controller Device

755

No

Tuner Returns the Table Which is Sepcified in the Table_Id Field to the Controller Device

760

End

FIGURE 7

Declaration and Power of Attorney for a Patent Application

Declaration

As below named inventor, I hereby declare that my residence post office address, and citizenship are as stated below my name. Further, I hereby declare that I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND SYSTEM FOR DEVICES EFFICIENTLY SHARING INFORMATION REGARDING THE
CONTENT OF A DIGITAL TELEVISION BIT-STREAM

the specification of which:

 X is attached hereto, or
..... was filed on as application serial no. : and
..... was amended on

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above; and

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

Foreign Priority Claim

I hereby claim foreign priority benefits under Title 35, United States Code Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Number	Country	Date Filed	Priority Claimed
.....	yes no
.....	yes no

U.S. Priority Claim

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Serial Number	Filing Date	Status (patented/pending/abandoned)
60/146,071	07/28/99	PENDING
.....

Power of Attorney

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent Trademark Office connected therewith.

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Signatures

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole/First Inventor: Sho Kou

Inventor's Signature Sho Kou Date 6-8-00

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